

AN IMPRESSIONIST TEXT-BOOK OF PAPER MAKING.

Chapters on Papermaking. Vol. i. By Clayton Beadle. Pp. 151. (London: H. H. Grattan, 1904.)

THERE is a "mission" for science in relation to industry which is to re-infuse into its reiterated routine operations that measure or kind of interest which we know as "intelligent." Our factory workers are not the craftsmen of the past centuries; division of labour makes this difficult, and in many cases impossible. But though shut out from the "joy" of the craftsman, and far removed from that higher order of appreciation which makes the craft of the Oriental a part of his religion, our workers can cultivate an intelligent interest in their work. The book before us is directed to this particular aim, and is especially justified in regard to the art of papermaking, not only because modern papermaking is in all essential respects based on the ancient craft, but the various operations are interdependent on such obvious lines that whatever particular section of the work a man may be engaged in, he can easily acquire and keep an intelligent grasp of the whole.

The book may be described as a series of studies of special points, largely and evidently such special points as have from time to time challenged the interest of the author in the course of his occupation as chemist to one of our oldest and most important paper mills. There is no essentially logical sequence in these studies, but we agree with the author that there is no occasion to multiply routine text-books. It is obvious, therefore, that there is no call to read the chapters in any particular order. The subjects treated may be briefly summarised as follows:—Raw fibrous materials and cellulose; bleaching and general view of the chemistry of the operations; the whole question of the function of water in relation to the manufacturing operations, as well as the physical and chemical points involved in the relation of water to the celluloses; paper in relation to the entire range of its applications, and the destructive agencies which it is required to resist and survive.

In dealing with these subjects the author follows the original method, that is, he develops his theme largely by original observations and investigations, trusting to the particular perspective of his own experience to give the subject-matter its cohesion. The result is quite satisfactory. There is room for contributions of this kind.

As a particular illustration of the author's methods, we may mention the statistical discussion on pp. 90–93 of the total contribution of basic matters in working up a rag pulp, both engine sized (resin) and tub sized (gelatin and soap), in relation to the sulphate of alumina required to be used. This subject might be very much extended to involve many of the most interesting developments of modern chemical science, e.g. the ionisation of salts and the peculiar functions of the organic colloids in relation to electrolytes in solution. There is no doubt that the reactions in the beater will not be understood until studied in relation to these questions.

In a discussion of the theory of the bleaching process, the author returns to some questions arising in the study of one of the systems of electrolytic bleaching, which was based upon the circulation continuously of the electrolysed (MgCl_2) solution between the electrolyser and the potcher. There is no doubt that this condition gives an unexpected maximum of bleaching efficiency, possibly because energy may be carried in some particular forms not necessarily expressed in the simple oxidising actions of the solution, as, e.g., on HI or As_2O_3 . In this connection it is to be noted that Brunck advances a similar hypothesis in relation to ozone and its oxidising reactions (*Zeitsch. angew. Chem.*, 1903, p. 894).

Further, according to the specification of recent patents (Schuckert), the addition of certain organic compounds, more particularly resin (soda resinate), to a solution of an alkali chloride to be electrolysed enables a very much higher concentration of "bleaching chlorine" to be economically worked. Certainly there are points here which should attract investigators to a re-examination of the phenomena.

On the general question of bleaching actions, the author is somewhat discursive, and there are one or two inaccuracies and omissions in small but not less essential points. Thus, on p. 90, the reaction of sodium sulphite as an "antichlor" is stated to add to the alkalinity of the pulp. The normal sulphites in oxidising to the normal sulphates do not affect the balance of alkalinity. In cases where potassium iodide is decomposed by a paper, i.e. by a constituent of the paper, with liberation of iodine, the methods of Wurster should certainly have been imported into the investigation. The investigations of Russell should have been noticed, and the subject connected with the general question of autoxidation.

We mention such points to show that the methods of the author are suggestive rather than exhaustive, and paper mill chemists especially will find these lectures full of matter to set them thinking, observing, and in turn investigating a number of phenomena which they might otherwise neglect or pass over.

We apply in conclusion the text which opened this brief review:—There is the human side even to the highly competitive production of modern times, and authors who contribute to this aspect of industry, and notably to the pleasure of the worker, are deserving of the particular encouragement of a large circulation.

THE DEVELOPMENT OF THE HUMAN BRAIN.

Die Entwicklung des menschlichen Gehirns während der ersten Monate. Untersuchungsergebnisse von Wilhelm His. Pp. iv+176. (Leipzig: S. Herzl, 1904.) Price 12 marks.

THIS work, as its title indicates, deals with the development of the human brain during the first four months. Half of the book, on the development of the cerebral hemispheres and the origin of the intramedullary tracts, is original matter, and continues the work already commenced in 1890 by the author's paper on the organisation of the medulla. The re-

maining half of the book deals with the early histogenesis of the nervous system, and is practically a recapitulation of the author's previous results, all, however, carefully re-studied in the light of additional material, and copiously illustrated with original photographs.

Apart from its scientific value, for which, indeed, the author's name is a sufficient guarantee, the book is a striking testimony to the debt neurology owes the late Prof. His, for not only is the entire work, comprising practically all that is known of the development of the human brain, based on the author's own observations, but most of the facts here described owe their first explanation to Prof. His.

In the introduction, the author briefly describes his methods, chief of which is his "graphic reconstruction," originally described by him in 1880, the only difference being that photographs of serial sections are now used instead of drawings. Following this is a tabular statement of the embryos used, and a discussion of the difficulties of age estimation, and the introduction closes with an earnest appeal for systematic measurements of all prematurely born embryos at gynaecological institutions.

The first portion of the book deals with the development up to the close of the first month, and commences with an account of the author's myelospongium, which, in opposition to Koelliker, he believed to be a syncytial network formed by the union of outgrowths from the spongioblast cells.

The author originally held that connective tissue cells took part in the formation of the definitive neuroglia, and especially that this was the mode of origin of Deiter's cells; in the present work, however, he agrees with the majority of neurologists that the original neural plate is alone concerned in the formation of the supporting tissue.

The author's "Keimzellen," as he showed in 1891, form both nerve cells and glia cells, and, as Schaper maintained in 1897, they are merely undifferentiated cells of the myelospongium in active multiplication, not, as the author originally supposed, a special form of cell to be distinguished from all other cell-elements in the neural plate.

The author gives a brief criticism of recent papers in opposition to the neurone conception, on behalf of which, it will be remembered, Prof. His was one of the first advocates; in particular he deals with Bethe's paper of 1903, in which the nerve is made to arise from a linear syncytial cell series which also later forms Schwann's sheath; His shows that Bethe is really dealing with the mesenchymatous sheath, which in the lower vertebrates, *i.e.* chick, appears very early; in man, as His's photographs clearly show, there is no possibility of confusing the growing end of the non-medullated nerve bundle with the surrounding tissue, and especially is this the case with Meynert's "fremdartiger" strands, as these grow into regions of the myelospongium practically free from cells. This portion of the book closes with a full description of the neural tube of an embryo at the end of the fourth week, "Embryo N" already described in previous papers.

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The second portion of the book deals with the development of the cerebral hemispheres, and commences with a description of the author's well-known models; this is followed by a detailed account of the histogenetic differentiation of the hemispheres up to the close of the first month, and is illustrated by numerous exceedingly clear photomicrographs. A few pages follow on the blood vessels of the fore-brain. The last twenty-five pages deal with the origin of the intramedullary tracts.

The whole book is written expressly for the professed neurologist, and abounds in tabular statements, references to individual embryos, and so forth; but there is much, especially in the earlier parts of the book, which is also of interest to the student of general morphology, and it is on behalf of such students that we could wish the numerous excellent photographs of brain sections had been provided with reference letters.

No bibliography accompanies the book, a want duly apologised for in the preface. It should also be noted that, as indicated above, the whole development of the brain is not dealt with; in the author's words,

"Ich theile mit, was mir mehr oder minder abgeschlossen vorliegt. Die Zwischenkapitel hoffe Ich, falls mir Leben und Arbeitskraft bleiben, in absehbarer Zeit zu können."

All zoologists will regret that this hope is not destined to be fulfilled.

G. C. C.

THE TURBELLARIA AS PARASITES AND PARASITE-CARRIERS.

Die Turbellarien als Parasiten und Wirte. By L. von Graff. Pp. vi+65. (Graz: Leuschner und Lubensky's Universitäts-Buchhandlung, 1903.) Price 14.50 marks.

PROF. VON GRAFF'S latest work dealing with the Turbellaria is no less interesting than any of its predecessors, and students of parasitology must stand greatly indebted to him for putting together in such an accessible and stimulating form a full summary of all that is at present known of parasitism amongst the Turbellaria. The first half of the work is devoted to an account of the anatomy of six species of parasitic rhabdocoels. Although all of these have been previously described by von Graff himself, or by other writers, the ampler accounts here given clear up many doubtful points and supply precise information not hitherto available on various anatomical features. This part of the work is illustrated with three plates of great excellence.

The second part is devoted to considerations of a more general character. It includes a list of all known Turbellaria which have adopted a parasitic or commensal habit. Amongst them von Graff distinguishes four principal grades of parasitism, namely, (1) occasional commensalism; (2) ectoparasitism; (3) occupation of some chamber in the body of the host which communicates with the exterior; and (4) endoparasitism. The author points out that the effects of parasitism of the second and third grades do not pro-